

# NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the space program.

## Refractory Thermal Insulation for Smooth Metal Surfaces

**The problem:** Rocket aft-end metal surfaces suffer rapid deterioration from engine-exhaust heat. Conventional insulation will not adhere to these smooth surfaces and must be attached with devices which are themselves subject to exhaust heat deterioration.

**The solution:** A new refractory insulation that contains refractory white pigments of high optical reflectance, refractory fibers for strength, an inorganic bonding agent curing at room temperature by interaction with water, and an organic adhesion-inducing ingredient which brings about adhesion to metal of the water-plasticized ingredients.

**How it's done:** The surface to be insulated is first cleaned thoroughly and given a prime coat consisting of latex, a copolymer of maleic anhydride and methyl vinyl ether, and a commercial silica sol. When the prime coat has cured, a composition of the following ingredients is applied.

- Titanium dioxide
- Asbestos
- Refractory fiber
- Calcium aluminate
- Latex
- Maleic anhydride-methyl vinyl ether copolymer
- Silica sol

Thickness of the applied mixture may be varied to insulate smooth metal surfaces over a wide temperature range.

### Notes:

1. Shear loads of 5 psi of insulation/metal interface can be borne up to 700°F interface temperature.
2. This material makes a useful, trowelable heat insulation with metal-adhering qualities.
3. The oven, furnace, and boiler manufacturing industries might be able to use this material to advantage.
4. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama, 35812  
Reference: B64-10099

**Patent status:** NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA Headquarters, Washington, D.C., 20546.

Source: Goodyear Aerospace Corporation  
under contract to Marshall Space Flight Center  
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